Research Paper: The Anti-Parkinsonism Effects of K_{ATP} Channel Blockade in the 6-Hydroxydopamine-Induced Animal Model: The Role of Oxidative Stress

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ABSTRACT

Introduction: Studies suggest that ATP-sensitive potassium (K_{ATP}) channels are a potential pharmacotherapeutic target for neuroprotection in neurodegenerative diseases. The current study aimed at evaluating the effect of pretreatment with glibenclamide (Glib) and B vitamins supplement on the severity of behavioral symptoms in 6-hydroxydopamine (OHDA)-induced Parkinsonism. Also malondialdehyde (MDA) concentration was measured in the blood and brain suspensions to find probable neuroprotective mechanism of Glib.

Methods: The 6-OHDA was injected into striatum of rats by stereotaxic surgery. Treatment with Glib and B vitamins was started before the surgery and continued up to 3 weeks after that. Development and severity of Parkinsonism were evaluated by conventional behavioral tests. MDA values were measured spectrophotometrically using thiobarbituric acid and MDA standard curve.

Results: Pretreatments with Glib, at both doses of 1 and 5 mg/kg or B vitamins significantly ameliorated severity of the behavioral symptoms. Pretreatment with a combination of Glib and B vitamins was more effective than pretreatment with Glib or B vitamins alone. Also, pretreatment with B vitamins, Glib, or a combination of them reduced MDA concentration in the brain suspensions. Decrease in MDA concentration in the group of rats that received a combination of B vitamins and Glib was more prominent than that of the Glib groups.

Conclusion: As severity of the behavioral symptoms in the 6-OHDA-induced Parkinsonism reflects the degree of the lesion in Substantia Nigra (SN) dopaminergic neurons, it is suggested that Glib pretreatment has neuroprotective effect against 6-OHDA-induced neurotoxicity. The current study data also showed that this effect may be mediated by antioxidant effect of Glib.

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